

# MOBILE LEARNING APPLICATION BASED ON RSS FEED TECHNOLOGY

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## ABSTRACT

This paper presents a mobile learning application for a learning course at higher education level. Based on the RSS feed technology, the presented mobile application establishes an in-time communication channel between the instructor and his/her students to keep them up-to-date with all course important dates, instructions and information in addition to a download center to provide them a permanent and fast access to all course lectures and resources. Security issues are also taken into consideration, only students who are currently enrolled in the learning course are allowed to access the mobile application through a security control which is simple and adequate in the same time. The presented mobile learning application is currently available to be downloaded and installed through Google Play store (formerly called Android Market) on almost all Android devices starting from Android 2.1 and higher. Future work includes further enrichment of the application by adding additional modules and functionalities as well as increasing the application availability by developing other versions for Windows 8 and iOS smartphones and tablets in order reach a wider range of students.

## KEYWORDS

Mobile learning, RSS feed, higher education.

## 1. INTRODUCTION

Another important factor arises recently i.e. the wide spreading of intelligent devices as well as high-functionally operating systems such as Android for smart devices introduced by Google in addition to Windows 8 introduced recently by Microsoft. The great advantage of these new operation systems that they are compatible with large variety of mobile device regardless their manufacturers. These emerging operating systems can operate a wide range of smartphones, tablets, and even TV boxes for a huge list of manufacturers around the world. This advantage provides the application developer a high degree of flexibility in addition to the possibility to develop a mobile application that is valid for many users without caring about the brand of their devices.

Thus, new possibilities are offered to teachers to reach their students. A pilot project was proposed as first mobile learning (will be referred to it as m-learning in the rest of this document) experience in our university. The main objective of this project is to verify the feasibility of applying m-learning at higher education levels, in order to offer mobile application as a teaching alternative. This paper presents the mobile application developed and how it may be more useful than a course portal website. Such an experiment could help designers in future developments of m-learning applications.

In the rest of this paper, we demonstrate the primary suggestions of application design and how it was modified and adapted to reach a rather final design. In addition, we discuss the RSS feed technology, its advantages, and how it is employed in our mobile application. Afterwards, we show how the mobile application is implemented and deployed as well as how security concerns are treated. Next, we explain how the mobile application advantages compared with the course portal website in addition the advantages provided by the employment of RSS feed technology. Finally, we present a brief discussion about technical and administration difficulties which impede the larger expansion of m-learning solutions.

## 2. MOBILE APPLICATION DESIGN

In our m-learning application, we decided to develop a pilot version to run the Android environment for simplicity and the easiness to establish a proper development and simulation environment as well as the high degree of compatibility provided by the Android operating system which allows us to reach as many students as possible. The presented mobile application is compatible with Android 2.1 up to higher Android versions. This makes it suitable for a wide variety of mobile devices whether smartphones or tablets.

### 2.1 Primary Application Design

In order to realize as much as possible of m-learning objectives and to profit from its advantages, four modules of the mobile application were suggested:

- **Course actualities:** In order to realize the *anywhere* and *anytime* characteristics of m-learning, the objective of this first module is to establish an immediate communication channel between the professor and his/her students. Through this module, students are be up-to-date with important dates such as dates and hours of examinations, assignments due dates, a lecture cancelation, or any important information which the instructor desires to diffuse it rapidly.

- **Course lectures:** This module presents the course lectures. All course lectures are recorded and made available to be downloaded through this module. The course which our application is developed for is an in-class course and NOT a distance course. Consequently, there is no live distance lectures. Recorded video prepared by the instructor here are optional and can be considered as an additional advantage for mobile application users.

- **Download center:** The download center is the course repository where the mobile application user can find the course documents such as the course syllabus, important guides and documentations in the form of PDF (Portable Document Format) files.

- **Auto-evaluation:** This module allows the student to self-evaluate his/her progress in the learning course in the form of questions and answers and the program gives the result in the end of the auto-evaluation test in order to provides the application user the chance to identify his weaknesses points before real tests.

Upon the course instructor request, second and the third modules are merged (course lectures and download center) into one module, and the auto-evaluation module is deferred to upcoming versions.

To achieve our mobile application: we followed the RSS feed technology employed in the news websites. We need first to briefly explain this technology and its advantages.

### 2.2 RSS News Feed Technology

RSS (Rich Site Summary) or (Really Simple Syndication) is a web feed format developed by Netscape in 1999 in order to publish frequently updated works web contents such as news headlines and blog entries. Nowadays, this technology is widely used by news and business websites to keep their visitors updated with any changes in the website contents. The main benefit of RSS web feeds is that they summarize the latest content of a web page or a collection of web pages from different sources and allow the user to quickly link back to the original full article is he/she needs to get more details about a topic of interest.

An RSS document is a standardized XML file format. It is called a 'feed' or 'web feed'. A typical RSS feed usually includes a linked headline and a short descriptive text in addition to some publishing information such as the author name and the publishing date.

The user needs an RSS reader is needed to allow him/her read RSS feeds in a human readable format. Once the reader is installed on the user's machine (PC, laptop, tablet, smartphone...etc) and set up with RSS feeds, the RSS feed reader is updated automatically with the latest content for the feeds which the user is subscribed in.

### 2.3 Final Application Design

In order to realize the two agreed application modules (figure 1.a), we have employed the RSS news feed technology. Two XML files (one file for each module) are used as the feed sources as follows:

- The first xml file contains the important dates of the course and any information the course instructors desires to distribute to students.
- The second file contains links to allow application users to download PDF, audio, and video files as well as a short description for each.

An RSS reader is developed and embedded in the mobile application to parse them. Figure 1.b shows the download center module as viewed on an Android tablet.



Figure 1. a. Mobile application main page (smartphone view), b. Download center module (tablet view)

### 3. APPLICATION IMPLEMENTATION AND DEPLOYMENT

A secured web space is allocated on the university web server for storing the two XML files representing the sources of the two application modules. Only authorized application administrators can access this web space in campus or remotely through a secured VPN connection.

Ensuring that only authorised user who can only access the course resources is also taken in consideration. For this purpose, an encrypted access code is created randomly and stored in a secure file on the application server. At the beginning of each trimester, the course instructor distributes the current operational access code to currently enrolled student to permit them to access the mobile application. This access code is changed on regular bases e.g. at least at the start of each semester to prevent ancient students from having access to course resources. Figure 2.a shows the access code entry page which permits the user through the application if he enters the access code correctly.

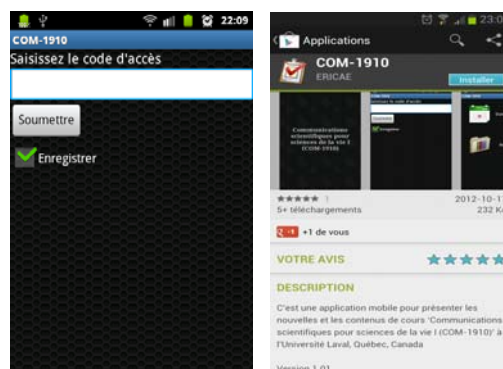


Figure 2. a. Access code screen (smartphone view), b. Application download page on Google Play store

The m-learning application is developed and deployed to Google Play store through the 'eclipse' development tool. A test version (version 1.0) is uploaded to the market. Afterwards, a final version (version 1.01) is deployed and published after adding the access code check page. Currently, the mobile application users can download and install it from the Google Play store as shown in figure 2.b.

#### 4. ADVANTAGES OF USING MOBILE LEARNING APPLICATION

Usage of mobile telecommunication data networks is so sensitive because of their rather high costs compared with those of using office or home networks for internet surfing. Thus, volume of download data required to get certain information still a worrying obsession for most mobile data users.

Mobile applications provide a time and money saving solution for this problem. In our case study i.e. the m-learning application, the application furnishes the course enrolled students a simple, fast, and exceptionally low data bandwidth consuming tool to have access to course resources. The m-learning application provides three main advantages which can be summarized as follows:

- **Save time and effort:** less number of steps is required to access the same information of the course portal website.

- **Incredible Decrease of data bandwidth consumption:** Data bandwidth consumed in order to start the mobile application, to verify the access code, and to read the two XML files representing the two application modules is 8.99 KB. While the data bandwidth consumed to enter the login information and load home page of the course portal website is 3.81 MB which is 434 times greater than data bandwidth consumed by the m-learning application to arrive at the same point.

- **Interactivity:** Mobile applications, in general, provide high degree of interactivity with end-users. This feature is essential at the need for adding further modules such as auto-evaluation, context-aware assignments, and live surveys.

Furthermore, usage of RSS feed technology offers three key advantages:

- **Simplicity and symmetry:** Application modules are so simple and have exactly the same structure.
- **Lightness:** Pages are light to be downloaded and the application size is minimum (576 KB) which leads to considerable savings in device and telecommunication resources.

- **Maintainability:** As a result of the standard structure of XML files used as RSS sources.

#### 5. DISCUSSION AND FUTURE WORK

The m-learning application is developed for the purpose to provide an m-learning service at the university level based on the RSS feed technology. However, the application is still an optional and supportive part of the learning course which it is applied for; thereby enrolled students in this course are not obligated to utilize it. Indeed, there are three main reasons forcing this choice as follows:

1. In the case of imposing the mobile application and making it a mandatory part of the learning course, the university -is obligated to provide course enrolled students with mobile devices required to have access to the mobile application.

2. Presently, the m-learning application is developed and ready for use on Android devices only. Consequently, students holding devices working by different operating systems will not be able use the application.

3. The third reason is an administrative one; it is a global obstacle fronting the wide spreading of m-learning, which is the fact that there is still no formal procedure agreed by the university (and many other learning institutions) to manage learning courses based entirely on m-learning technology.

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